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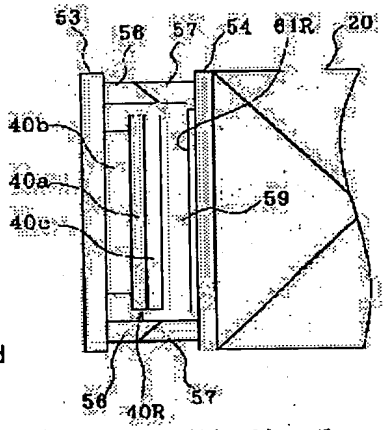
(54) PROJECTOR

(57)Abstract:

PROBLEM TO BE SOLVED: To contribute to the size reduction, higher luminance, and higher reliability of a projector by more improving the cooling performance of an optical modulation part composed of a liquid crystal panel, etc.

SOLUTION: This projector is constituted by fitting a liquid crystal panel 40R which modulates light according to image information to a prism 20 which composites multiple color light; and the light-incidence side end surface of the liquid crystal panel 40R is fixed to a 1st transparent heat radiation plate 53, which is fixed to a prism 20 (where a 2nd heat radiation plate 54 is stuck upon occasion) across heat-conductive coupling members 56 and 57 arranged on both the side parts of the 1st transparent heat radiation plate while an air passage 59 is formed between the liquid crystal panel 40R and prism 20.



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CLAIMS

[Claim(s)]

[Claim 1] The projector characterized by being the projector which comes to attach the light-modulation equipment which modulates light according to image information in the prism which compounds two or more colored light, the optical incidence end face of said light-modulation equipment fixing to the 1st transparence heat sink, and it being fixed to said prism through the thermally conductive bond part material matched for the both-sides section with said 1st transparence heat sink, and coming to form an air course between said light-modulation equipment and said prism.

[Claim 2] The projector according to claim 1 characterized by the polarizing plate having fixed to the optical incidence end face of said prism between said thermally conductive bond part material.

[Claim 3] The projector according to claim 1 characterized by for the 2nd transparence heat sink fixing to the optical incidence end face of said prism, and fixing said 1st transparence heat sink to said prism through said thermally conductive bond part material and said 2nd transparence heat sink.

[Claim 4] The projector according to claim 3 characterized by the polarizing plate having fixed to said 2nd transparence heat sink between said thermally conductive bond part material.

[Claim 5] The projector according to claim 1 to 4 characterized by making the appearance of said 1st transparence heat sink into the magnitude which does not contact the 1st transparence heat sink by which is beyond the appearance of the optical incidence end face of said prism, and contiguity arrangement was carried out.

[Claim 6] The projector according to claim 1 to 5 which said thermally conductive bond part material is a prism configuration, and is characterized by constituting the side attachment wall of said air course.

[Claim 7] The projector according to claim 6 characterized by having consisted of part I material by which said thermally conductive bond part material was fixed to said 1st transparence heat sink, and part II material fixed to said prism side, and said part I material and said part II material having fixed by parallel inclination end faces mutually.

[Claim 8] The projector according to claim 6 characterized by said thermally conductive bond part material and said 1st transparence heat sink having fixed by parallel inclination end faces mutually.

[Claim 9] The projector according to claim 1 to 8 characterized by being the liquid crystal panel with which said light modulation equipment comes to close liquid crystal between the TFT substrate which stuck protection-against-dust glass, this TFT substrate, and the opposite substrate which counters.

[Claim 10] The projector according to claim 9 characterized by using said 1st transparence heat sink as said opposite substrate.

[Claim 11] The projector according to claim 1 to 10 characterized by combining said prism possible [the member which is fixing this prism, and thermal conduction].

[Claim 12] The projector according to claim 3 to 11 characterized by combining said 2nd transparence heat sink possible [the member which is fixing said prism, and thermal conduction].

[Claim 13] The projector according to claim 1 to 12 characterized by having arranged the protection-from-light member around the optical passage service area of said light modulation equipment.

[Claim 14] The projector according to claim 13 characterized by having arranged said protection-from-light member possible [thermal conduction] to said thermally conductive bond part material.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the light modulation equipment which is applied to a projector, especially consists of a liquid crystal panel etc., and the structure of the optical system near colored light composition prism where it is located after that.

[0002]

[Description of the Prior Art] In the projector, the arrangement structure of the optical system the light modulation equipment which consists of a liquid crystal panel etc., and near colored light composition prism is indicated by JP,2000-221587,A or JP,2000-221588,A. In these official reports, although the device which raises the assembly nature and dependability of this part was performed by storing a liquid crystal panel in a panel frame, and attaching it in colored light composition prism, cooling of a liquid crystal panel was almost dependent on cooling in the air course established between a panel frame and prism.

[0003]

[Problem(s) to be Solved by the Invention] However, since the miniaturization of a projector and high brightness-ization were promoted and the heat consistency in equipment has risen compared with the former, much more improvement in the cooling engine performance of the light modulation equipment part which consists of a cure against heat dissipation inside a projector, especially a liquid crystal panel, etc. is needed in recent years. This invention was made in order to solve the above-mentioned technical problem, it tends to aim at much more improvement in the cooling engine performance of light modulation equipment, and tends to contribute to high-reliability-ization etc. at the miniaturization of a projector, a raise in brightness, and a list.

[0004]

[Means for Solving the Problem] This invention is a projector which comes to attach the light modulation equipment which modulates light according to image information in the prism which compounds two or more colored light. It is fixed to the 2nd transparence heat sink which the optical incidence end face of said light modulation equipment fixed to the 1st transparence heat sink, and fixed through said prism or said prism through the thermally conductive bond part material matched for the both-sides section with said 1st transparence heat sink. It is characterized by coming to form an air course between said light modulation equipment and said prism, or said 2nd transparence heat sink.

[0005] Since heat is radiated [according to this invention] to colored light composition prism by heat conduction the heat of light modulation equipment minded the 1st transparence heat sink and thermally conductive bond part material (it is also included when there is the 2nd transparence heat sink) in addition to light modulation equipment being cooled by the air passing through an air course, the cooling effectiveness improves, therefore it can contribute to high-reliability-ization at the miniaturization of a projector, a raise in brightness, and a list.

[0006] In this invention, if a polarizing plate is fixed to the optical incidence end face of said prism between said thermally conductive bond part material, or said 2nd transparence heat sink, a polarizing plate will also radiate heat by air cooling and heat conduction. Moreover, in this invention, the heat sinking plane product of the 1st transparence heat sink can be enlarged more, without being able to make the appearance of said 1st transparence heat sink into the magnitude which does not contact the 1st transparence heat sink by which is beyond the appearance of the optical incidence end face of said prism, and contiguity arrangement was carried out, and enlarging the configuration of the whole equipment in that case.

[0007] Moreover, in this invention, if the side attachment wall of said air course is constituted by making said thermally conductive bond part material into a prism configuration, a cooling wind will be rectified and cooling effectiveness will increase. moreover -- from the part I material fixed to said 1st transparence heat sink in said thermally conductive bond part material in this invention, and the part II material fixed to said prism side -- constituting -- said part I material and part II material -- mutual -- parallel inclination end faces -- using -- ****** -- if it is made like, the direction of an optical axis of light modulation equipment and colored light composition prism can be positioned easily. In addition, the same effectiveness is acquired even if it fixes mutually said thermally conductive bond part material and said 1st transparence heat sink by parallel inclination end faces.

[0008] Moreover, said light modulation equipment can be used as the liquid crystal panel which comes to close

liquid crystal between the TFT substrate which stuck protection-against-dust glass, this TFT substrate, and the opposite substrate which counters in this invention. In addition, the configuration of a liquid crystal panel can be simplified by using said 1st transparence heat sink as said opposite substrate in this case.

[0009] Moreover, in this invention, if said prism and said 2nd transparence heat sink are combined possible [the member which is fixing this prism, and thermal conduction], heat dissipation effectiveness can be gathered further.

[0010] Moreover, in this invention, if a protection-from-light member is arranged around the optical passage service area of said light modulation equipment, a harmful leakage light can be shaded. In this case, if a metal plate etc. is used for a protection-from-light member, protection of light modulation equipment and the improvement in heat dissipation effectiveness will also be combined, and it will become possible. Furthermore, if said protection-from-light member is arranged possible [thermal conduction] to said thermally conductive bond part material, the heat dissipation effectiveness of light modulation equipment can be improved further. In addition, the same effectiveness can be acquired even if it allots a light-shielding film to a root face perimeter with said TFT substrate of said protection-against-dust glass, and the perimeter of a root face with said light modulation equipment of said 1st transparence heat sink.

[0011]

[Embodiment of the Invention] Drawing 1 and drawing 2 are the top views and side elevations showing the arrangement for the principal part inside the projector concerning the example of this invention. In the case of this example, in the interior of the sheathing case 2, a power supply unit 7 is arranged at that back end side, and the light source lamp unit 8 and the optical unit 9 are arranged in the location which adjoined the before [equipment] side rather than this. Furthermore, the end face side of the projection lens unit 6 is located in the center by the side of before the optical unit 9.

[0012] On the other hand, the interface substrate 11 in which the input/output interface circuit was carried towards the equipment cross direction is arranged, and the video substrate 12 in which the video signal processing circuit was carried is arranged in parallel with this at one optical unit 9 side. Furthermore, the control board 13 for equipment drive control is arranged at the light source lamp unit 8 and optical unit 9 bottom, and Loudspeakers 14R and 14L are arranged at the angle of right and left by the side of the equipment front end, respectively.

[0013] The inhalation-of-air fans 15A and 15B for equipment internal intercooling are stationed at the upper part of the optical unit 9, and a lower part. Moreover, the ventilating fan 16 is arranged in the equipment side face which is the rear-face side of the light source lamp unit 8. And the auxiliary cooling fan 17 for attracting the airstream for cooling from inhalation-of-air fan 15A in a power supply unit 7 is arranged in the location facing the edge of the substrates 11 and 12 in a power supply unit 7. Fan 15B is functioning among these fans as a fan for liquid crystal panel cooling who mainly mentions later.

[0014] Drawing 3 is the outline block diagram of the optical unit 9 of this projector. Each optical element (element) which constitutes the optical unit 9 is supported by the upper light guide 80 which consists of metals, such as Mg and aluminum, or the bottom light guide 90 including the prism 20 which constitutes the colored light composition means. The upper light guide 80 and the bottom light guide 90 are being fixed to the upper case 3 and the lower case 4 by the lockscrew, respectively.

[0015] Drawing 4 is the detailed block diagram of the optical unit 9. The illumination-light study system 923 in which the optical unit 9 has the light source lamp 805 and the integrator lens 921,922 it is [lens] a homogeneity illumination-light study component, The colored light separation optical system 924 which separates into red, green, and each blue colored light bundles R, G, and B the flux of light W by which outgoing radiation is carried out from this illumination-light study system 923, It consists of liquid crystal panels 40R, 40G, and 40B of three sheets which modulate each colored light bundle according to image information, colored light composition prism 20 which compounds the modulated colored light bundle, and a projection lens unit 6 which carries out expansion projection of the compounded flux of light on a projection side. Moreover, it has the relay optical system 927 which leads the blue glow bundle B to corresponding liquid crystal panel 40B among each colored light bundle separated according to the colored light separation optical system 924.

[0016] Further, the illumination-light study system 923 is equipped with the reflective mirror 931, turns optical-axis 1a of the outgoing radiation light from the light source lamp 805 to equipment front, and he is trying to bend it at a right angle. This mirror 931 is pinched and it is arranged at the condition that the integrator lens 921,922 intersects perpendicularly forward and backward.

[0017] The colored light separation optical system 924 consists of a bluish green reflective dichroic mirror 941, a green reflective dichroic mirror 942, and a reflective mirror 943. First, in the bluish green reflective dichroic mirror

941, the blue glow bundle B included there among the flux of lights W which passed along the homogeneity illumination-light study system 923, and the green light bundle G are reflected by the right angle, and it goes to the green reflective dichroic mirror 942 side. This mirror 941 is passed, it is reflected by the right angle by the back reflective mirror 943, and outgoing radiation of the red flux of light R is carried out to a colored light composition optical-system side from the outgoing radiation section 944 of the red flux of light. Next, in the green reflective dichroic mirror 942, the green light bundle G is reflected by the right angle among the blue and the green flux of lights B and G which were reflected in the mirror 941, and outgoing radiation is carried out to a colored light composition optical-system side from the outgoing radiation section 945 of a green light bundle. Outgoing radiation of the blue glow bundle B which passed the mirror 942 is carried out to the relay optical-system 927 side from the outgoing radiation section 946 of a blue glow bundle. In this example, all the distance from the outgoing radiation section of the flux of light of the illumination-light study system 923 to the outgoing radiation section 944,945,946 of each colored light bundle in the colored light separation optical system 924 is set up so that it may become almost equal.

[0018] The condenser lens 951,952 is arranged at the outgoing radiation side of the outgoing radiation section 944,945 of the red flux of light of the colored light separation optical system 924, and a green light bundle, respectively. Therefore, incidence of the red flux of light and the green light bundle which carried out outgoing radiation from each outgoing radiation section is carried out to these condenser lenses 951,952, and they are made parallel.

[0019] After, as for the red and the green flux of lights R and G which were made parallel, the polarization direction is arranged by polarizing plates 60R and 60G, incidence is carried out to liquid crystal panels 40R and 40G, it becomes irregular, and the image information corresponding to each colored light is added. That is, switching control of these liquid crystal panels 40R and 40G is carried out with the picture signal corresponding to image information by the driving means which is not illustrated, and, thereby, the modulation of each colored light which passes through this is performed. A well-known means can be used for such a driving means as it is.

[0020] On the other hand, the blue glow bundle B is led to liquid crystal panel 40B which corresponds after the polarization direction is further arranged by polarizing plate 60B through the relay optical system 927, and a modulation is similarly performed in here according to image information.

[0021] The relay optical system 927 consists of a condenser lens 974, the incidence side reflective mirror 971, an outgoing radiation side reflective mirror 972, a middle lens 973 arranged among these mirrors, and a condenser lens 953 arranged to the near side of liquid crystal panel 40B. The blue glow bundle B becomes the longest, therefore the quantity of light loss of this flux of light of die length [die length of the optical path of each colored light bundle], i.e., the distance from the light source lamp 805 to each liquid crystal panel, increases most. However, quantity of light loss can be controlled by making the relay optical system 927 intervene.

[0022] Incidence of each colored light bundle modulated through each liquid crystal panels 40R, 40G, and 40B is carried out to polarizing plates 61R, 61G, and 61B, the light which penetrated this carries out incidence of it to the colored light composition prism 20, and it is compounded. Expansion projection of the color picture compounded here is carried out on the projection side 7 in a position through the projection lens unit 6.

[0023] Next, the various attachment modes to the colored light composition prism 20 of the above-mentioned liquid crystal panels 40R, 40G, and 40B are explained. In addition, below, although explained for liquid crystal panel 40R about red light, other liquid crystal panels 40G and 40B can be treated like it.

[0024] The top view in which example 1. drawing 5 shows an example of an attachment mode to the colored light composition prism 20 of liquid crystal panel 40R, and drawing 6 are the lengthwise direction sectional views of drawing 5 . In addition, liquid crystal panel 40R shall have TFT substrate 40a, opposite substrate 40b, and protection-against-dust glass 40c, and liquid crystal shall be enclosed between TFT substrate 40a and opposite substrate 40b, and control cable 41R shall be extended outside from TFT substrate 40a. In addition, control cable 41R is omitted except drawing 6 .

[0025] the optical incidence end face of the colored light composition prism 20 -- kana, such as sapphire and Xtal, -- the thermally conductive good single crystal transparence heat sink (the 2nd transparence heat sink 54) was fixed with adhesives etc., and polarizing plate 61R has fixed with adhesives etc. in the optical passage section of the 2nd transparence heat sink 54 further. on the other hand -- liquid crystal panel 40R -- the optical incidence end-face side (opposite substrate 40b side) -- using -- kana, such as sapphire and Xtal, -- it has fixed with adhesives etc. to the thermally conductive good single crystal transparence heat sink (the 1st transparence heat sink 53).

[0026] The 1st transparence heat sink 53 and the colored light composition prism 20 equipped with liquid crystal panel 40R are equipped with an air course 59 among them, and are combined by adhesives or pewter welding

through the thermally conductive bond part material 56 and 57 of the pair of the prism configuration which consists of single crystals, such as sapphire arranged to the right-and-left flank, and Xtal, or a metal, a ceramic, etc. Vertical installation fixing of the thermally conductive bond part material 56 and 57 is carried out to the optical ON outgoing radiation end face of each transparence heat sink 53 and 54. Moreover, the thermally conductive bond part material 56 and 57 of a pair fixes mutually using an parallel inclined plane, and forms the side attachment wall of the air course which consists of liquid crystal panel 40R and colored light composition prism 20. In addition, at the time of association with liquid crystal panel 40R and the colored light composition prism 20, fixing beforehand either of the thermally conductive bond part material 56 and 57 of a pair to the 1st transparence heat sink 53 or the 2nd transparence heat sink 54, and making another thermally conductive bond part material slide using a mutual tip inclined plane, liquid crystal panel 40R and the colored light composition prism 20 are positioned in the direction of an optical axis, and they are fixed in the place which positioning completed.

[0027] moreover , as show in drawing 6 , the lower limit section of the 2nd transparence heat sink have join possible [thermal conduction] with the bottom light guide 90 and the adhesives etc. which support each optical element which constitute the optical system containing the metal prism stationary plate 30 and/or the metal colored light composition prism 20 which fix the colored light composition prism 20 through the heat dissipation sheet 33 (for example , graphite sheet which be made to carry out the pyrolysis of the high polymer film , and obtained it) equipped with a high temperature conduction property , flexible nature , etc. (or association) . In addition, the colored light composition prism 20 may be fixed to the bottom light guide 90 of direct without minding the prism stationary plate 30. By the way, sign 90a is opening of the bottom light guide 90 prepared corresponding to the air course 59 formed by liquid crystal panel 40R, the colored light composition prism 20, and the thermally conductive bond part material 56 and 57 among drawing 6 .

[0028] By this configuration, since those heat conducts liquid crystal panel 40R and polarizing plate 61R to the prism stationary plate 30 or the bottom light guide 90 through the 1st transparence heat sink 53, the thermally conductive bond part material 56 and 57, the 2nd transparence heat sink 54, and heat dissipation sheet 33 grade in addition to being cooled by the air along which it passes air course 59, those rates of heat dissipation increase.

[0029] In addition, thermally conductive bond part material is good for a right-and-left flank also as a configuration which arranges one thermally conductive bond part material 58 for each, as it is not necessary to necessarily constitute from a member of a pair and is shown in drawing 7 . However, let mutually the plane of composition of the 1st transparence heat sink 53 or the 2nd transparence heat sink 54, and the thermally conductive bond part material 58 be the thing to the colored light composition prism 20 of liquid crystal panel 40R to carry out as [position / easily / in the case of attachment (fixing) / the direction of an optical axis of liquid crystal panel 40R and the colored light composition prism 20] as an parallel inclined plane even in this case.

[0030] Moreover, through the colored light composition prism 20 of a projector, since liquid crystal panels 40R, 40G, and 40B are attached corresponding to each of red light, green light, and blue glow, the configuration of the 1st transparence heat sink 53 can be increased that much like drawing 8 in the range which does not contact the 1st transparence heat sink 53 of ******. That is, it becomes possible to raise the rate of heat dissipation of liquid crystal panels 40R, 40G, and 40B or polarizing plates 61R, 61G, and 61B, maintaining the miniaturization of equipment, since the heat sinking plane product of the 1st transparence heat sink 53 was enlarged with constituting like drawing 8 , without enlarging the whole equipment.

[0031] Moreover, in the above-mentioned example, although the 2nd transparence heat sink 54 was stuck on the colored light composition prism 20, as shown in drawing 9 , polarizing plate 61R and the thermally conductive bond part material 56, 57, and 58 may be directly fixed to the optical incidence end face of the colored light composition prism 20, without sticking it, when the colored light composition prism 20 consists of high temperature conductivity transparence single crystal members, such as sapphire and Xtal. Moreover, also in such a case, if the colored light composition prism 20 is joined to the prism stationary plate 30 or the bottom light guide 90 possible [thermal conduction] with adhesives etc., the heat of liquid crystal panel 40R or polarizing plate 61R will conduct and radiate heat to the prism stationary plate 30 and/or the bottom light guide 90 through the colored light composition prism 20.

[0032] Moreover, as shown in drawing 10 , it is also possible to make opposite substrate 40b of liquid crystal panel 40R and the 1st transparence heat sink 53 serve a double purpose, and the part configuration can be simplified in that case. However, it is necessary to make to make somewhat thicker opposite substrate 40b of liquid crystal panel 40R etc. into the structure where liquid crystal panel 40R can be borne at such use.

[0033] Example 2. drawing 11 is the top view showing other examples of the attachment mode to the colored light composition prism 20 of liquid crystal panel 40R. In this example, the fixed approach to the colored light

composition prism 20 of liquid crystal panel 40R is not different from it in the case of drawing 5 and drawing 6 at all. However, in order that a light harmful for this optical system may carry out incidence to liquid crystal panel 40R or may prevent carrying out outgoing radiation from liquid crystal panel 40R, the protection-from-light member 71 is fixed to the optical incidence end face of the 1st transparence heat sink 53 corresponding to the perimeter of the optical incidence side service area of liquid crystal panel 40R, and the protection-from-light member 72 is fixed here around the optical outgoing radiation side service area of liquid crystal panel 40R. Here, stick the protection-from-light member 72 to liquid crystal panel 40R, the thermally conductive bond part material 56, and 57 (you may fix), the heat of liquid crystal panel 40R is made to conduct to the colored light composition prism 20 side further through the protection-from-light member 72 and the thermally conductive bond part material 56 and 57, and the rate of heat dissipation is raised. In this configuration, the damage at the time of liquid crystal panel 40R handling can also be reduced by the protection-from-light members 71 and 72. In addition, a metal, the heat dissipation sheet 33 explained previously can be used for the protection-from-light member 72. Moreover, the protection-from-light member 71 can raise the protection-from-light effectiveness further, if it forms so that it may cover to the edge surface part of the 1st transparence heat sink 53.

[0034] Drawing 12 allots a light-shielding film 73 to the perimeter of a root face with liquid crystal panel 40R of the 1st transparence heat sink 53 (an optical passage service area perimeter of a liquid crystal panel), and a light-shielding film 74 is allotted to the perimeter of a root face with TFT substrate 40a of protection-against-dust glass 40c which constitutes liquid crystal panel 40R further (an optical passage service area perimeter of a liquid crystal panel), and a light harmful to optical system can carry out incidence to liquid crystal panel 40R, or it can prevent carrying out outgoing radiation from liquid crystal panel 40R.

[0035] In addition, by forming drawing 11 , the protection-from-light members 71 and 72 in drawing 12 , and light-shielding films 73 and 74 from the above-mentioned heat dissipation sheet metallurgy group, since heat dissipation is promoted by them, the rate of heat dissipation of liquid crystal panel 40R can be increased.

[0036] As mentioned above, although some examples have been explained, the following is raised as effectiveness common to these examples.

- By improvement in the rate of heat dissipation of the light modulation equipment circumference, a fan's miniaturization and the formation of small driving force which cool them are attained, and it can contribute to the miniaturization of a projector, and low noise-ization.
- By improvement in the rate of heat dissipation of the light modulation equipment circumference, correspondence in the further raise in the brightness of a projector is attained.
- By improvement in the rate of heat dissipation of the light modulation equipment circumference, a liquid crystal panel and a polarizing plate can be held below to allowable temperature, and deterioration and degradation of the orientation film of a liquid crystal panel and a polarizing plate can be controlled.
- Since it constitutes from glass fundamentally with light modulation equipment and prism, it is hard to generate the location gap by difference of coefficient of thermal expansion among these units, and pixel gap decreases.
- By adopting glass as a transparence heat sink, nebula of the liquid crystal panel which originated in maintenance of the liquid crystal panel by the plastics frame, and had been produced is canceled.

[0037] Moreover, without limiting this invention to the above-mentioned example, as long as various deformation and modification are possible and it is in this technical thought, those deformation and modification are also included in this invention. For example, light modulation equipment may not be restricted to a liquid crystal panel, for example, may be the equipment using a micro mirror, and CCD (charge-coupled device). Moreover, colored light composition prism may not be restricted to the dichroic prism with which two kinds of color selective surfaces were formed along the adhesion side of four triangle pole-like prism, but color selective surfaces may be one kind of dichroic prism, and a polarization beam splitter. In addition, you may be what arranges an optical selective surface in the box of abbreviation hexahedron-like light transmission nature, and was filled up with the liquid there. Furthermore, although the front projection mold display which performs projection, and the direction which observes a projection image have the tooth-back projection mold display which performs projection from the opposite side from the direction which observes a projection image as a projection mold display, the configuration shown in the above-mentioned example is applicable to the all.

[0038]

[Effect of the Invention] Since heat is radiated to the light guide which supports prism and it by heat conduction the light modulation equipment which consists of a liquid crystal panel etc. minded the 1st transparence heat sink, thermally conductive bond part material, the 2nd transparence heat sink, etc. in addition to being cooled by the air passing through an air course according to the invention in this application, the cooling effectiveness improves,

therefore it can contribute to high-reliability-ization at the miniaturization of a projector, a raise in brightness, and a list.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The top view showing the arrangement for the principal part inside the projector concerning the example of this invention.
[Drawing 2] The side elevation showing the arrangement for the principal part inside the projector concerning the example of this invention.
[Drawing 3] The outline block diagram of the optical unit of the projector of this example.
[Drawing 4] The detail block diagram of the optical unit of the projector of this example.
[Drawing 5] The top view to the colored light composition prism of a liquid crystal panel.
[Drawing 6] The lengthwise direction sectional view of drawing 5 .
[Drawing 7] The top view showing an example of the attachment mode to the colored light composition prism of a liquid crystal panel.
[Drawing 8] The top view showing an example of the attachment mode to the colored light composition prism of a liquid crystal panel.
[Drawing 9] The top view showing an example of the attachment mode to the colored light composition prism of a liquid crystal panel.
[Drawing 10] The top view showing an example of the attachment mode to the colored light composition prism of a liquid crystal panel.
[Drawing 11] The top view showing an example of the attachment mode to the colored light composition prism of a liquid crystal panel.
[Drawing 12] The top view showing an example of the attachment mode to the colored light composition prism of a liquid crystal panel.
[Description of Notations]
20 -- Colored light composition prism
30 -- Prism stationary plate
33 -- Heat dissipation sheet
40R, 40G, 40B -- Liquid crystal panel
53 -- The 1st transparence heat sink
54 -- The 2nd transparence heat sink
56, 57, 58 -- Thermally conductive bond part material
59 -- Air course
61R, 61G, 61B -- Polarizing plate
71 72 -- Protection-from-light member
73 74 -- Light-shielding film
90 -- Bottom light guide

[Translation done.]